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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/796,146

03/10/2004

Mizuhisa Nihei

040102

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06/18/2007

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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

MAIL DATE

DELIVERY MODE

06/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/796,146

Applicant(s)

NIHEI ET AL.

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 11-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to Applicant Amendment dated 3/12/2007.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 1. Claims 2-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

► With respect to claim 2,

line 4, "the film on the heat conductor" lacks antecedent basis. Moreover, scope of claim is not clear. It is not clear that which element on the heat conductor – a second hole on the heat conductor or just the film being on the heat conductor. Applicant is respectfully to clarify and use appropriate consisting claimed language to clarify scope of claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 7, 8 and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chen [US 6,191,478].

► With respect to claim 1, Chen (fig 5 & 8, cols 1-8) discloses the claimed semiconductor device comprising:

- a SiC substrate (25, silicon carbide, col 5 lines 15-21); and
- a heat conductor (33, col 5 lines 4-38) formed in a first hole (27) in the SiC substrate and made of linear structure of carbon elements (carbon fiber),

wherein a diameter of the heat conductor is the same as a diameter of the first hole.

► With respect to claim 7, Chen (fig 5, 7 & 8, cols 1-8) discloses the claimed semiconductor device comprising:

- a SiC substrate (25, silicon carbide, col 5 lines 15-21) having a first surface and a second surface;
- a first heat conductor (33a, col 5 lines 4-38) formed in a first hole (27a, col 8 lines 38-55) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber);
- a second heat conductor (33b, col 5 lines 4-38) formed in a second hole (27b) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber); and
- an element (61, fig 7) formed on the second surface of the SiC substrate,

wherein a diameter of the first heat conductor is the same as a diameter of the first hole and a diameter of the second heat conductor is the same as a diameter of the second hole.

► With respect to claim 8, the claimed distance from the second surface of the SiC substrate to an upper surface of the second heat conductor relative (longer) to a distance from the second surface of the SiC substrate to an upper surface of the first heat conductor would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the range giving unexpected results, it is not inventive to discover optimal or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). Furthermore, it appears that these changes produce no functional differences and therefore would have been obvious. See In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

► With respect to claim 10, Chen (fig 5, 7 & 8, cols 1-8) discloses the claimed semiconductor device comprising:

a SiC substrate (25, silicon carbide, col 5 lines 15-21) having a first surface (the surface of the substrate 25 that defines hole 27b -- wall and bottom of hole 27b) and a second surface;

a first heat conductor (33a, col 5 lines 4-38) formed in a hole (27a, col 8 lines 38-55) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber);

a second heat conductor (33b, col 5 lines 4-38) formed to cover the first surface of the SiC substrate entirely (*second heat conductor 33b filling hole 27b would inherently entirely cover the first surface since the first surface of the substrate 25 is the surface that define the hole 27b*) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber); and

an element (61, fig 7) formed on the second surface of the SiC substrate, wherein a diameter of the first heat conductor is the same as a diameter of the hole.

Allowable Subject Matter

2. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

3. The following are statements of reasons for the indication of allowable subject matter:

► Recorded Prior Art fails to disclose or suggest the combination structure of the semiconductor as recited in the base claim 7 wherein the element is an HEMT and at least a part of the second heat conductor located between a gate electrode and a drain electrode of the HEMT when viewed from above the SiC substrate as characteristics in claim 9.

Response to Arguments

4. Applicant's arguments with respect to claims 1-8 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TSP

A handwritten signature in black ink, consisting of a series of loops and a final horizontal stroke.

THANHHA S. PHAM
PRIMARY EXAMINER